



PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 2002P07283WO	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP2003/006333	International filing date (day/month/year) 16 June 2003 (16.06.2003)	Priority date (day/month/year) 21 June 2002 (21.06.2002)
International Patent Classification (IPC) or national classification and IPC H04L 12/56		
Applicant SIEMENS AKTIENGESELLSCHAFT		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 10 sheets, including this cover sheet.
- ☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 6 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☒ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 07 October 2003 (07.10.2003)	Date of completion of this report 27 September 2004 (27.09.2004)
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/EP2003/006333

I. Basis of the report

1. With regard to the elements of the international application:*

- ☐ the international application as originally filed
- ☒ the description:
 pages 3-13, as originally filed
 pages _____, filed with the demand
 pages 1, 2, 2a, filed with the letter of 24 February 2004 (24.02.2004)
- ☒ the claims:
 pages _____, as originally filed
 pages _____, as amended (together with any statement under Article 19
 pages _____, filed with the demand
 pages 1-10, filed with the letter of 22 July 2004 (22.07.2004)
- ☒ the drawings:
 pages 1/1, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____
- ☐ the sequence listing part of the description:
 pages _____, as originally filed
 pages _____, filed with the demand
 pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item. These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

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IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees the applicant has:

- ☐ restricted the claims.
- ☐ paid additional fees.
- ☐ paid additional fees under protest.
- ☐ neither restricted nor paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

- ☐ complied with.
- ☒ not complied with for the following reasons:

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

- ☐ all parts.
- ☐ the parts relating to claims Nos. _____

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: IV.3

Lack of unity of invention

1. The Examining Authority has established that the international application includes multiple inventions or groups of inventions which are not so linked as to form a single general inventive concept (PCT Rule 13.1), namely:

I: claims 1-9 a method for transmitting data between a sending and a receiving station via at least two relay stations in a radio communications system, the data being retransmitted, in the event of defective transmission, by the sending station alone, thereby enhancing the use of energy by the relay stations;

II: claim 10: a relay station which forwards the received data according to the reception quality thereof, in order to economise on the bandwidth used.

2. The reasons for the above opinion are as follows:

- 2.1 Independent claims 1, 2 and 10 contain the following associated features:

/...

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: IV.3

a method for transmitting data in a radio communications system, the data being transmitted from a sending station to a data-receiving station via relay stations which receive and forward the data.

These features are all known from document D1 (figure 5; page 2, line 24 to page 3, line 22; page 9, lines 7-36).

- 2.2 By comparing the present groups of claims with D1, it can be seen that the following features make a contribution to the prior art and can therefore be considered special technical features (PCT Rule 13.2):

Group I: the re-transmission of data to the receiving station is triggered by the sending station alone.

Group II: the forwarding of received data by the relay station depends on the reception quality of the data.

- 2.3 The problems solved by the special technical features can be regarded as the following:

Group I: enhancing the use of energy by the relay stations.

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Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: IV.3

Group II: economising on the bandwidth used.

These two problems are not the same.

The aforementioned groups of claims therefore lack unity of invention (PCT Rule 13.1 and 13.2) in respect of both the special technical features and the problems solved.

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V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-9	YES
	Claims	10	NO
Inventive step (IS)	Claims	1-9	YES
	Claims	10	NO
Industrial applicability (IA)	Claims	1-10	YES
	Claims		NO

2. Citations and explanations

This report makes reference to the following documents (D1 to D5), cited in the search report:

- D1: WO 01 15374 A (CEDARDELL LTD; TODD ROBERT EDMUND (GB)), 1 March 2001 (2001-03-01)
- D2: US-A-4 882 765 (MAXWELL RAY F ET AL)
21 November 1989 (1989-11-21)
- D3: WO 00 74306 A (AFX TECH GROUP INT INC)
7 December 2000 (2000-12-07)
- D4: DUBE R ET AL: "SIGNAL STABILITY-BASED ADAPTIVE ROUTING (SSA) FOR AD HOC MOBILE NETWORKS",
IEEE PERSONAL COMMUNICATIONS, IEEE
COMMUNICATIONS SOCIETY, US, vol. 4, no. 1,
1 February 1997 (1997-02-01), pages 36-45,
XP000679252 ISSN: 1070-9916
- D5: EP-A-0 851 632 (LUCENT TECHNOLOGIES INC)
1 July 1998 (1998-07-01).

1. The present application fails to meet the requirements of PCT Article 33(1) because the subject matter of claim 10 lacks novelty (PCT Article 33(2)).

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Document D3 discloses the following features, which correspond to the all the features of claim 1:

a communications station (figure 5) in a radio communications system, said communications station being configured as a relay station and comprising:

- a receiving device for receiving data to be forwarded from a sending station (figure 5, reference sign 500);
- an analysis device for analysing the reception quality of said data (page 73, lines 1-9);
- a sending device for forwarding the data to a receiving station depending on the output of the analysis device (figure 5, reference sign 500; page 73, lines 1-9).

The subject matter of claim 10 therefore lacks novelty (PCT Article 33(1) and (2)).

The subject matter of claim 10 also lacks novelty relative to document D4 (page 38, left-hand column), or document D5 (figures 6A and 6B), according to which documents data is likewise forwarded by a relay station only if the reception quality is adequate.

2. The subject matter of claims 1-9 meets the requirements of PCT Article 33(1) to (3); the reasons are as follows:

- 2.1 Document D1, considered to be the closest prior art, discloses the following features, corresponding to part of claim 1:

a method for transmitting data in a radio communications system (figure 5, reference sign 201), in which:

- the data is sent from a sending station (figure 5, reference sign 202) to a data-receiving station (figure 5, reference sign ID#5) via at least two relay stations (figure 5, reference signs ID#1, ID#2, ID#3 and ID#4), each of which receives and forwards the data (figure 5; page 2, line 24 to page 3, line 22; page 9, lines 7-36).

The subject matter of claim 1 differs from document D1 in that:

- in the event of a defective transmission, the data is retransmitted in response to a receiver-side request; and
- the request is generated by the receiving station alone and sent to the sending station; and
- the sending station retransmits the data.

The subject matter of claim 1 is therefore novel (PCT Article 33(1) and (2)):

- 2.2 Document D1, considered to be the closest prior art, discloses the following features, corresponding to part of claim 2:

a method for transmitting data in a radio communications system (figure 5, reference sign 201), in which:

/...

- the data is sent by a sending station (figure 5, reference sign 202) to a data-receiving station (figure 5, reference sign ID#5) via at least two relay stations (figure 5, reference signs ID#1, ID#2, ID#3 and ID#4), each of which receives and forwards the data (figure 5; page 2, line 24 to page 3, line 22; page 9, lines 7-36); and
- in the event of defective transmission, retransmission of the data is triggered by the absence of a receiver-side acknowledgement (page 3, lines 4-10: transmits the message until the acknowledgement signal is detected").

The subject matter of claim 2 differs from that of document D1 in that:

- in the absence of the receiver-side acknowledgement, retransmission of the data to the receiving station is triggered by the sending station alone.

The subject matter of claim 2 is therefore novel (PCT Article 33(1) and (2)).

- 2.3 According to both claim 1 and claim 2, when data is retransmitted, it is directed to the receiving station by the sending station alone.

The problem addressed by the present invention is therefore regarded as that of enhancing the use of energy by the relay stations in a method for securing data transmission in a radio communications system.

/...

The solution to this problem, as proposed in claims 1 and 2 of the present application, involves an inventive step (PCT Article 33(1) and (3)); the reasons are as follows:

The problem addressed by document D1 is not the same as that addressed by the subject matter of claim 1. The teaching of document D1 gives rise to an increase, not a decrease, in the operations carried out by the relay stations in order that a report can reach a receiver as fast as possible.

According to the teachings of documents D2, D3 and D5, the relay stations store data that has already been sent and, under specific conditions, autonomously retransmit it.

Document D4 concerns a "routing protocol" with no retransmission of data.

A person skilled in the art is aware from his technical knowledge that, in a radio communications system, an acknowledgement of receipt is normally sent to each link. Said expert would not eliminate this acknowledgement without being prompted to do so, knowing that it would then no longer be guaranteed that all data would reach its destination.

Therefore, a person skilled in the art who wished to solve the above problem would not arrive at the subject matter of claims 1 or 2 on the basis of documents D1-D5 and/or of his specialist knowledge.

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Furthermore, with regard to claim 1, none of documents D1 to D5 discloses a method in which, in the event of defective transmission, data is retransmitted in response to a receiver-side request. According to said documents, the data is retransmitted only if there is no receiver-side acknowledgement.

Thus, the solution to this problem, as proposed in claims 1 and 2 of the present application, involves an inventive step (PCT Article 33(1) and (3)).

- 2.4 In the present case, the fact that there are two independent claims (claims 1 and 2) in the same category is considered reasonable (PCT Rule 6.1(a)) since said claims concern alternative solutions to the problem of enhancing the use of energy by the relay stations and, for reasons of clarity, it would be inappropriate to include these alternatives in a single claim.
- 2.5 Claims 3-9 are dependent on claims 1 and 2 and thus likewise satisfy the requirements of the PCT in respect of novelty and inventive step.
3. The following additional point should be noted:
- 3.1 Claim 1 has been duly drafted in the two-part a defective transmission, the data are retransmitted in response to a receiver-side request, should not have been included in the characterising part of said claim (PCT Rule 6.3(b)).

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